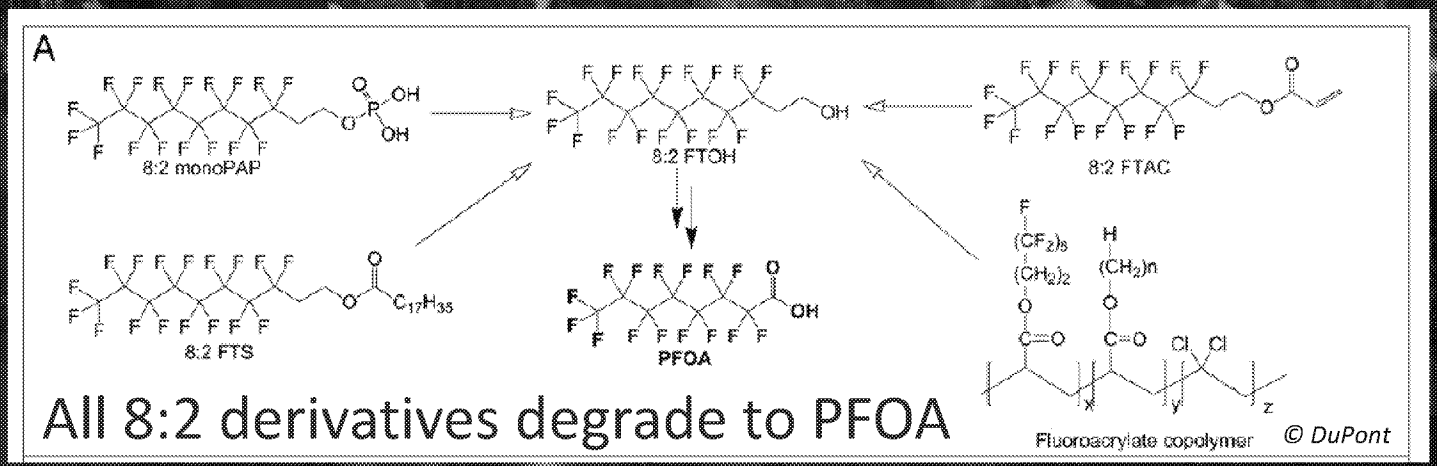
§A.3.1 Identified Hazard and Risk

"…PFOA and PFOA-related substances do not occur naturally. However, they are found ubiquitously in the environment – also in remote areas – since they can be transported over long distances via water and air. This results in findings in rivers, oceans, drinking water, the atmosphere and biota. Moreover, PFOA is present in human blood of the general population. Human exposure takes place via the environment, e.g., consumption of drinking water and food, or from consumer products, e.g., via uptake of contaminated indoor dust. PFOA is transferred to the foetus through the placenta and the infant is exposed to PFOA from Breast milk. Some epidemiological data from highly contaminated sites indicate adverse health outcomes....."

Source: ECHA Background document to the Opinion on the Annex XV dossier proposing restrictions on Perfluorooctanoic acid (PFOA), PFOA salts and PFOA-related Substances ECHA/RAC/RES-O-0000006229-70-02/F 11 September 2015

§A.3.1 Identified Hazard and Risk

"…PFOA-related substances degrade to PFOA under environmentally relevant conditions. Therefore, the hazard profile of PFOA applies to these substances as well. According to REACH, if transformation/ degradation products with PBT properties are being generated, ….."



Source: ECHA Background document to the Opinion on the Annex XV dossier proposing restrictions on Perfluorooctanoic acid (PFOA), PFOA salts and PFOA-related Substances ECHA/RAC/RES-O-0000006229-70-02/F 11 September 2015


8:2 FtOH ➔ PFOA
n:2 FtOH ➔ Cn PFCAs
This issue is not new –
8:2 FtS
there have been indications in the scientific literature since 1981!!
© R.A.Klein 2016

Outstanding problems

- The current ECHA PFOA restriction derogation for military and emergency services PPE will be time limited;
- Are so-called pure C6 fluorotelomers a long-term viable solution for PPE? – not really;
- → Alternative Technology needed

Lifetime Costs

- Maintenance and cleaning (?reduced lifetime?);
- Disposal of damaged PPE and wash-water;
- Wash-water as a regulated industrial waste;
- Remediation if environmental contamination is caused – PHENOMENALLY EXPENSIVE!;
- Legal and reputational costs;

- ➔ A Proper Cost-Benefit-Analysis (CBA) needed


Thank you for your attention
contact: rogeraklein@yahoo.co.uk
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Breathable and durable waterproof textiles

Bernhard Kiehl

Sustainability Programme Leader, Fabrics Division, WL Gore & Associates

Breathable and Durable Waterproof Textiles

- Regulatory changes and Impact for Fire Fighters

PPE and Duty of Care Forum Birmingham
February 2, 2016

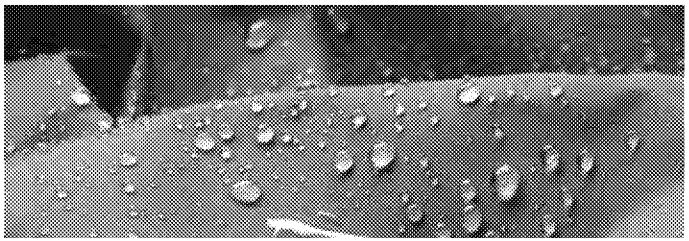
Bernhard Kiehl, W.L Gore & Associates
Sustainability Programme Leader Fabrics Division

Contents

1. Role of DWR in Functional Textiles for PPE
2. Regulatory Developments
3. Alternative Assessment Criteria and Tools
   - Lab and field performance
   - Environmental assessment
4. Conclusions

1. Role of DWR in Functional Textiles for PPE

What is DWR?

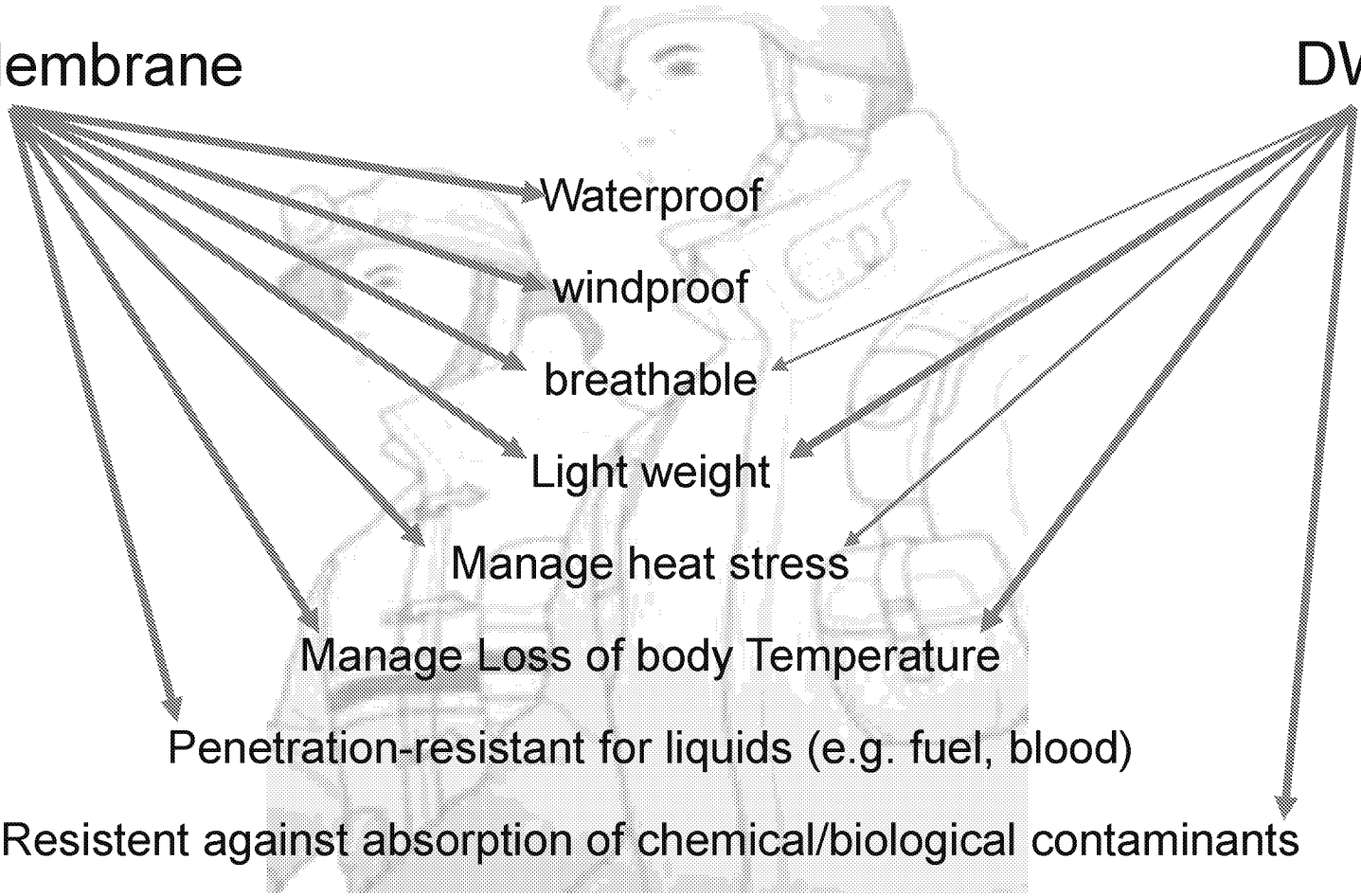


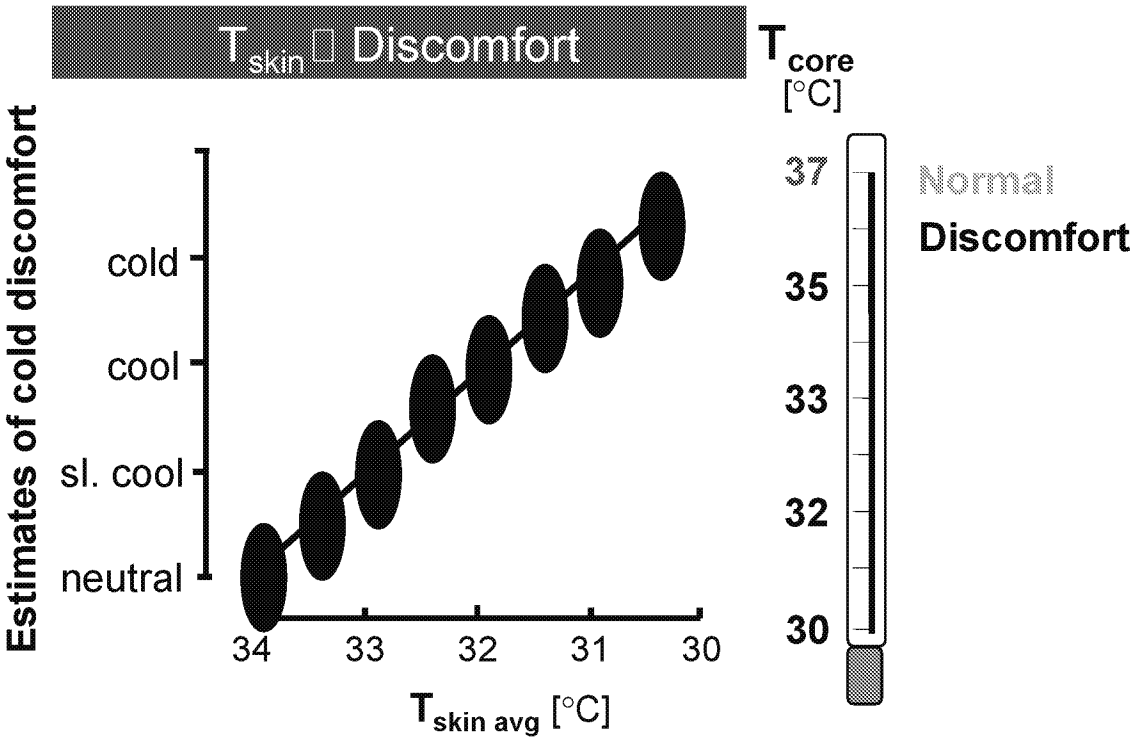
Durable **W**ater **R**epellent - a water and oil repellent treatment applied to the outer (shell) textile surface

Significantly reduces drying time, water weight gain, repells penetration of contaminants and is a critical part of durably comfortable PPE

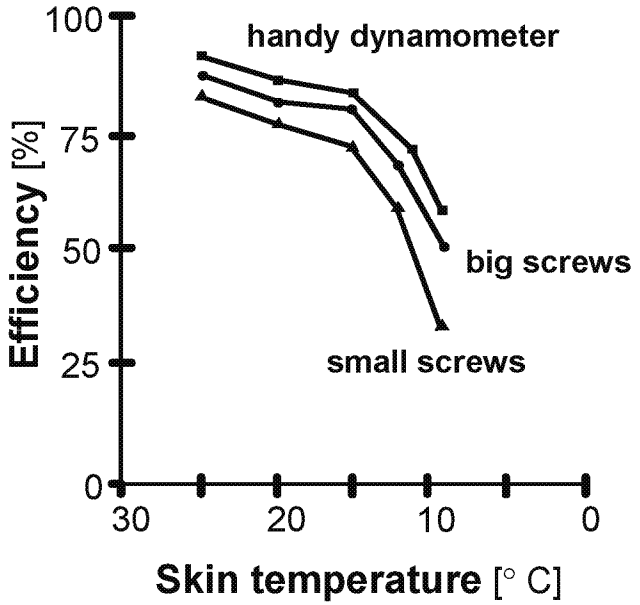
What does this mean to the user?

Laminate Components and Protection




T_{skin} Discomfort
T_{core} [°C]
Estimates of cold discomfort
cold
cool
sl. cool
neutral
34
33
32
31
30
$T_{skin\ avg}$ [°C]
37
35
33
32
30
Normal
Discomfort

T_{skin} Performance



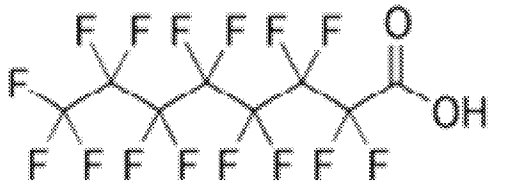
Key, H. Royal Navy Personnel Research committee, Rep.No.534, Med Res. Council London 1949

2. Regulatory Developments

The Issue

- All high performing durable water repellency technologies (DWR) based on “C8 fluorotelomers” contained trace impurities of PFOA
- The use of PFOA related materials will be restricted by regulations in the near future
- The entire textile industry is challenged to provide sufficient water and stain repellency with more environmentally friendly technologies

Perfluoro Octanoic Acid (PFOA)



$C_8HF_{15}O_2$

- Is very persistent in the environment
- Is found at very low levels both in the environment and in the blood of the general population
- Remains in people for a very long time
- Causes developmental and other adverse effects in laboratory animals.
- In EU PFOA was classified as *PBT* substance (Persistent & Bioaccumulative & Toxic)

PFOA in Apparel

- Apparel and footwear products were safe due to very low residual amounts and low dermal intake
  - *ENVIRON International Corporation/DuPont (April 2005)*
    "… indicates that exposures to PFO during consumer use of the articles evaluated in this study are not expected to cause adverse human health effects in infants, children, adolescents, adult residents, or professionals nor result in quantifiable levels of PFO in human serum."
  - In 2007 the German Federal Institute for Risk Evaluation stated:
    "Toxicological data and exposure calculations are available for PFOA in the literature which were undertaken on the basis of the maximum extractable content of the substance from treated textiles (various extraction agents) and a skin penetration rate for perfluorooctanoic acid. Based on these data the annual uptake from garment textiles, calculated for various groups in the population, is far lower than the values which are assumed as the threshold values for toxicological effects." (BfR Information No. 018/2007, 1 June 2007)
  - Oeko-Tex® Standard 100 and bluesign® standard accepted low residual amounts

NGO Challenge

- Apparel industry faces challenge of environmental pressure groups (i.e. Greenpeace) on chemicals, especially in Europe
- One chemical group targeted are *poly- and perfluorinated compounds* ("*PFC*") allegedly representing health and environmental risks
  - The campaign tactic is to generalize the risks of those two representatives (PFOA, PFOS) to the entire group of fluorinated chemicals
  - No consistent definition of "PFC" established

Regulatory Approach

- Those PFC under scrutiny of authorities are distinguished by environmental profiles:
  - **Long-chain PFC**, for which restriction of use are announced
  - **Short-chain PFC**, which were approved as replacements in US because they are have a lower or no bioaccumulation potential
- Voluntary Product Stewardship Program of the 8 global manufacturers of fluorinated polymers initiated by the US EPA: Elimination PFOA by 2015
- New uses of PFOA related materials are prohibited for carpets and textiles in US
- Current restriction proposal for PFOA under EU REACH chemical regulation
  - Restrictions for all products containing PFOA above a certain threshold
  - 3-6 years sunset-period

3. Assessment Criteria and Tools

Complex Set of Criteria

Technical Criteria

- Hydrophobicity / water repellency
- Oleophobicity / Oil repellency
- Efficacy
- Availability and processability

Environmental Criteria

- Human and Environmental Toxicity
  - Short term, long term
- Environmental Impacts
  - e.g. greenhouse gas effect, water pollution, eco-toxicity
  - along all stages of the value chain („cradle to grave“)
- Perception of stakeholders
  - Campaign organisations call for so called non-fluorinated DWR

Available Alternatives - Simplified

- Long chain fluorinated side chain polymers (long chain DWR)
  
- Short Chain fluorinated side chain polymers (short chain DWR)
- Non-fluorinated DWR
  - Silicones
  - Hydrocarbons
  - Dendrimers

…

Overview Hazard Properties

- Properties in focus with water and stain repellent technologies

	Persistent**	Bioaccumulative**	Toxic**
Long chain DWR (PFOA)	Yes	Yes	Yes
Short chain DWR	Yes	no	no
Non-fluorinated* DWR	no	no	no

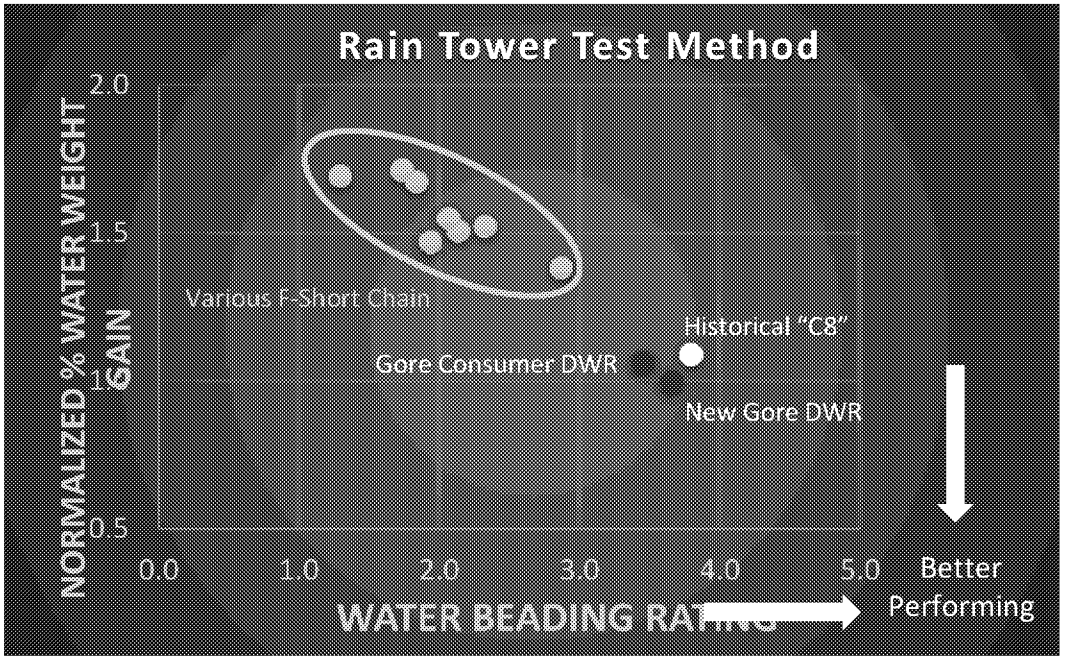
* hydrocarbons, dendrimers, silicones

** under US EPA PBT profiler criteria, Stockholm Convention on Persistent Organic Pollutants (Annex D), and EU (European Chemicals Agency) ECHA Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) Guidance on Information Requirements and Chemical Safety Assessment Chapter R.11 definitions

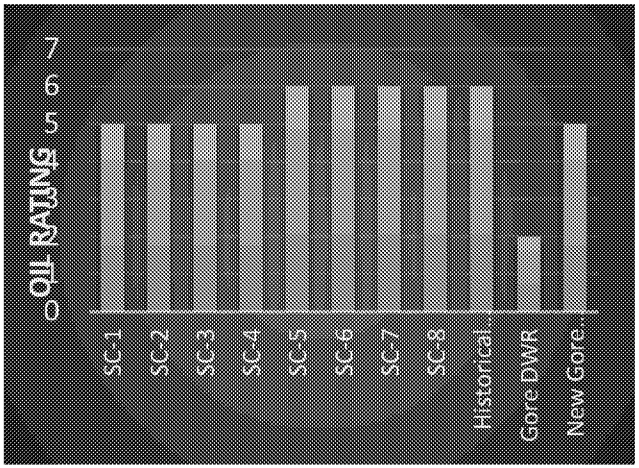
Gore started to reducing PFOA from its fabrics products in 2003. Completed the elimination from al raw materials for the entire range of textile products in 2013.

Broadly screened available materials (fluorinated and non-fluorinated) in proprietary lab testing method simulating failure modes

Short Chain Fluorinated Comparison - lab test method



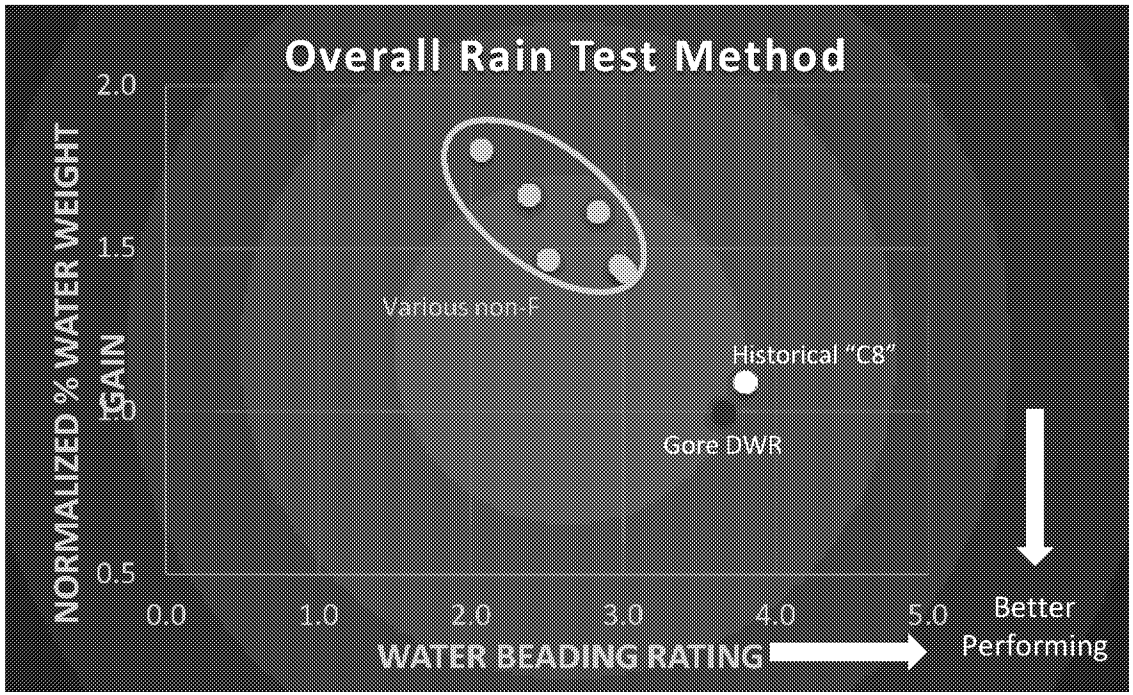
*data is for one representative textile laminate



All fluorinated treatments have oil repellency

Range of water repellency within fluorinated materials, test methods that challenge are important to differentiate

Non-F Comparison - lab test method



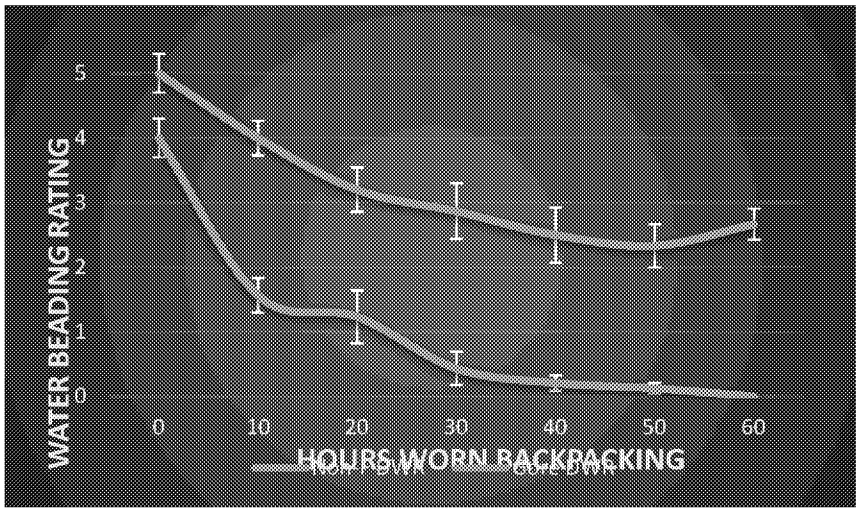
All oil ratings for non-F were = 0
Gore DWR = 5 Oil Rating

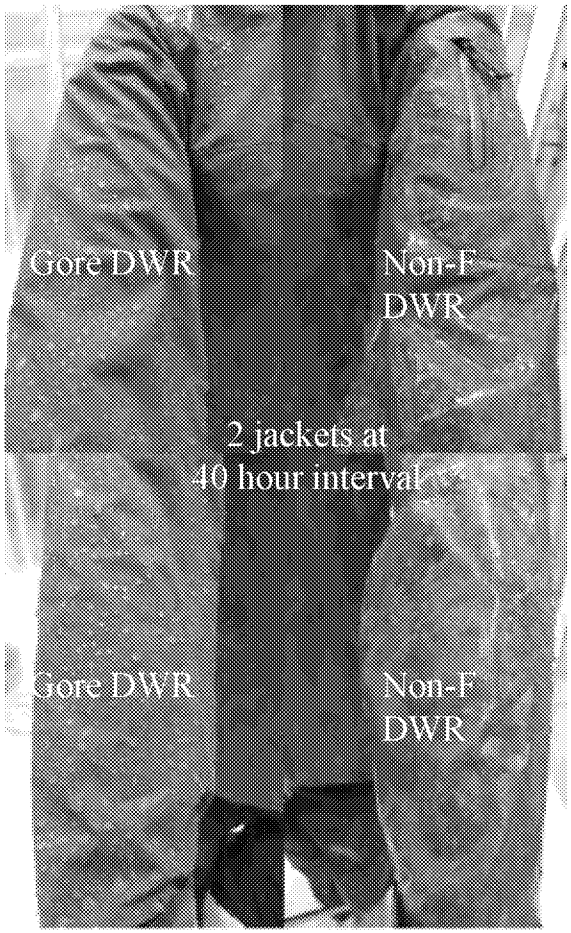
*data is for one representative textile laminate

DWR performance tests broadly applied in industry aren't representative for field use.

Gore selected the highest performing non-F material from lab testing and included it in backpacking field trials, to **assess the importance of oil rating.**

Gore Pro Shell Jacket - Backpacking activity





First evaluation point was after 10 hours of use. To understand performance between 0-10 hours included user comments

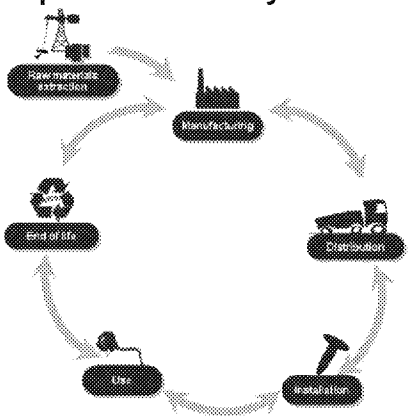
From User Comments 0-10 hour interval:
Non-F DWR mean time until beading failure approx. 1 hour
New Gore DWR provided beading

Field trial results were used to inform the assumptions in a holistic environmental assessment: Life Cycle Assessment (LCA)

The principles of LCA (ISO 14040-44)

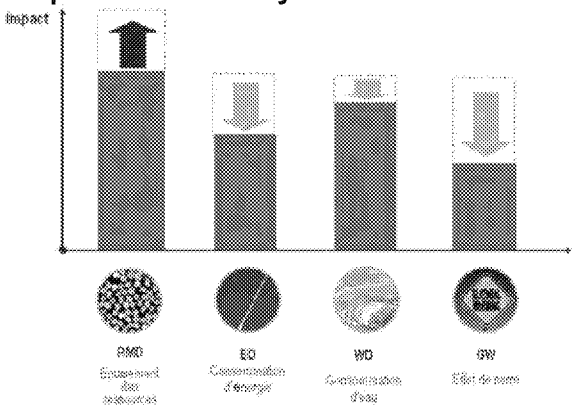
Multi-step:

To take in account all the steps of the product life cycle



Multi-criteria:

To take in account the different environmental issues linked to the product life cycle

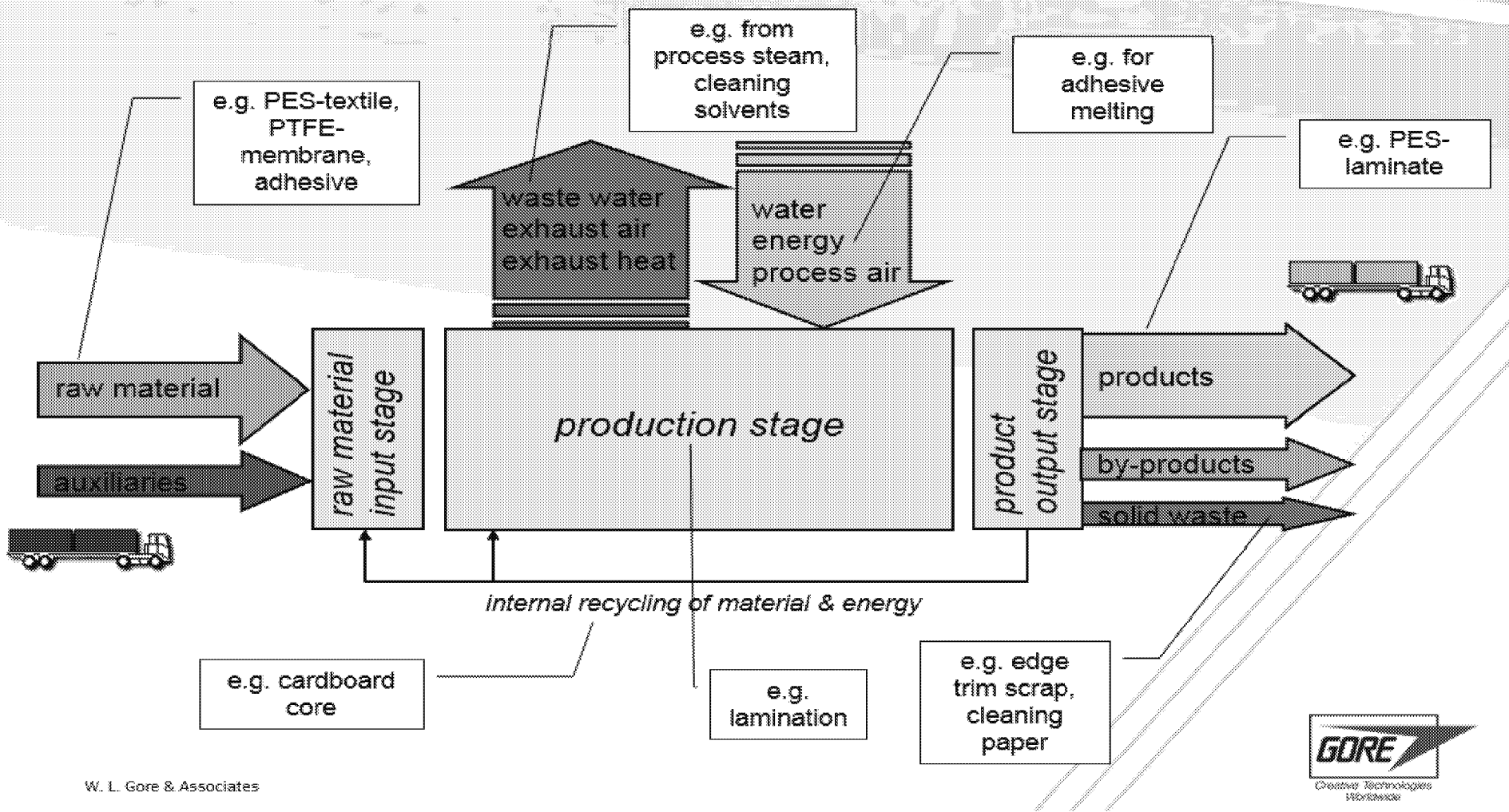


Assess the whole life cycle

Measure/quantify multiple impacts

A holistic approach to avoid pollution transfers from one step to another

Data Collection in Every Stage of Life Cycle



W. L. Gore & Associates

Cradle to grave toxicity potential of DWR treatments

Note the logarithmic scale

Care impacts far more than choice of chemistry, e.g. generating electric energy

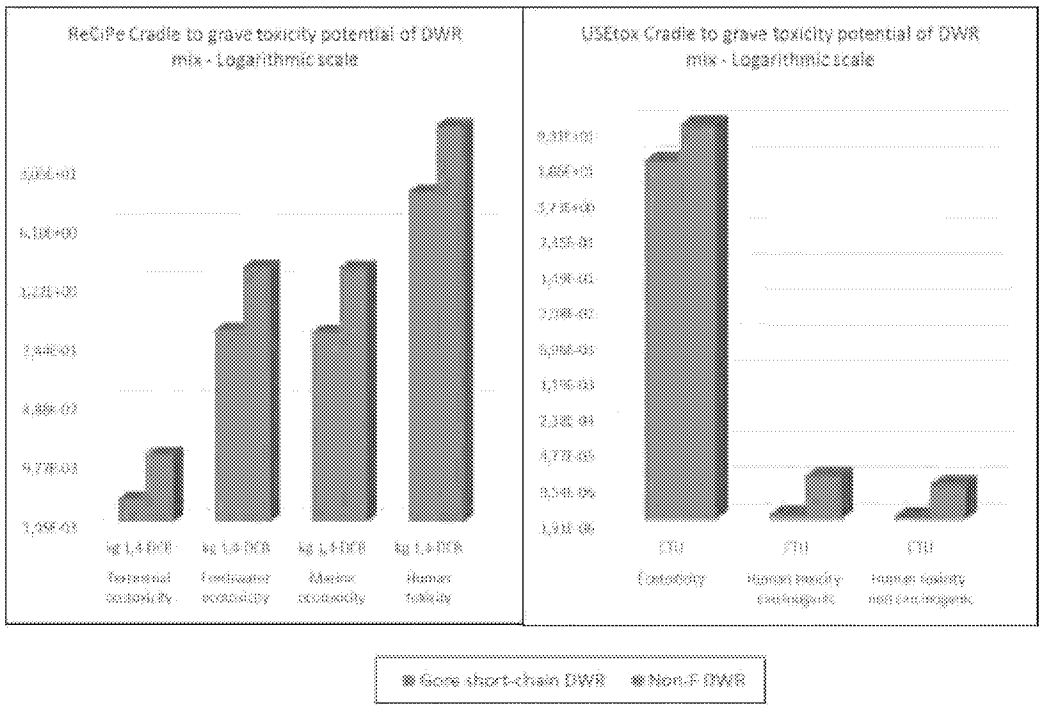


Figure 5: Overview of ReCiPe toxicity impact indicators, from cradle to grave, for DWR treatments on garments
Figure 6: Overview of USEtox™ toxicity impact indicators, from cradle to grave, for DWR treatments on garments

Conclusions

- A well performing and lasting DWR is important for PPE
  - even though it cannot replace a barrier
- Maintaining sufficient performance when moving to new DWR technologies is a challenges for the entire industry
- Non-fluorinated DWR does not provide oil repellency
- Care in order to maintain repellency performance influences environmental impacts far more than choice of chemistry
  - A good factory applied DWR can be re-activated many times before requiring chemical treatment
- Environmental analysis doesn‘t support the call for a general replacement of fluorinated DWRs.

➡ **Specifying DWR performance should take thorough performance testing and holistic environmental assessment into account**

Healthy Firefighters - Skelleftea Model

Stefan Magnusson

Principal Health & Safety Representative,
Skelleftea Fire & Rescue service, Sweden

HEALTHY
FIREFIGHTERS

Christmas Eve in 2005

- 2006 Healthy Firefighters project start.

HEALTHY FIREFIGHTERS

cooperation between employers' organizations and trade unions.

Kommunal.
Räddningstjänsten
www.kommunal.se

Sveriges Kommuner och Landsting

BRANDMÄNNENS RIKSFÖRBUND
BRF
FACKET FÖR SVERIGES BRANDMÄN

and agencies

MSB
Myndigheten för samhällsskydd och beredskap

ARBETSMILJÖ VERKET

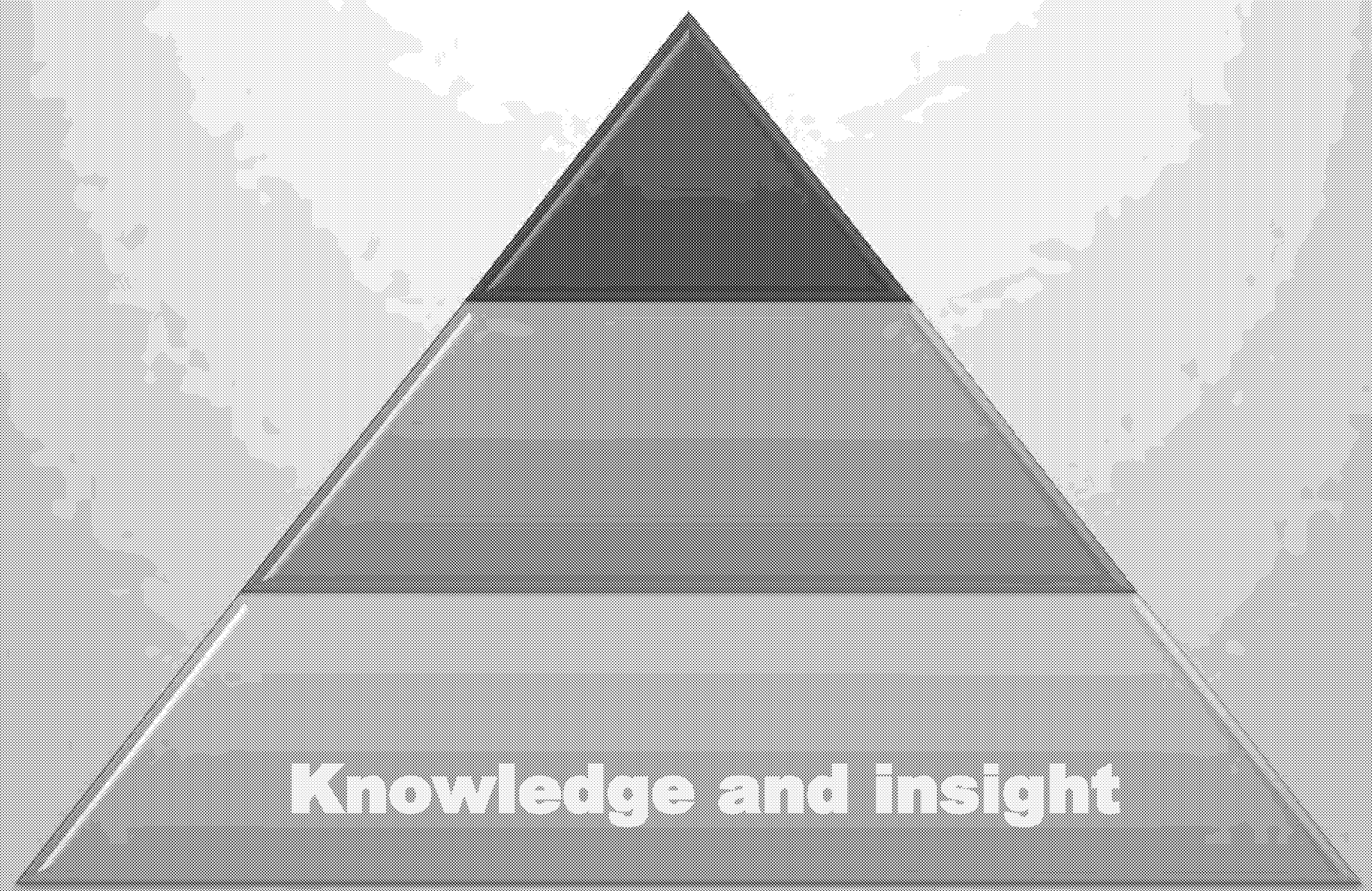
Why Healthy firefighters project?

- WHO 2007
- Lemasters meta study
- The consequences of combustion products are well known
- Constantly new reports

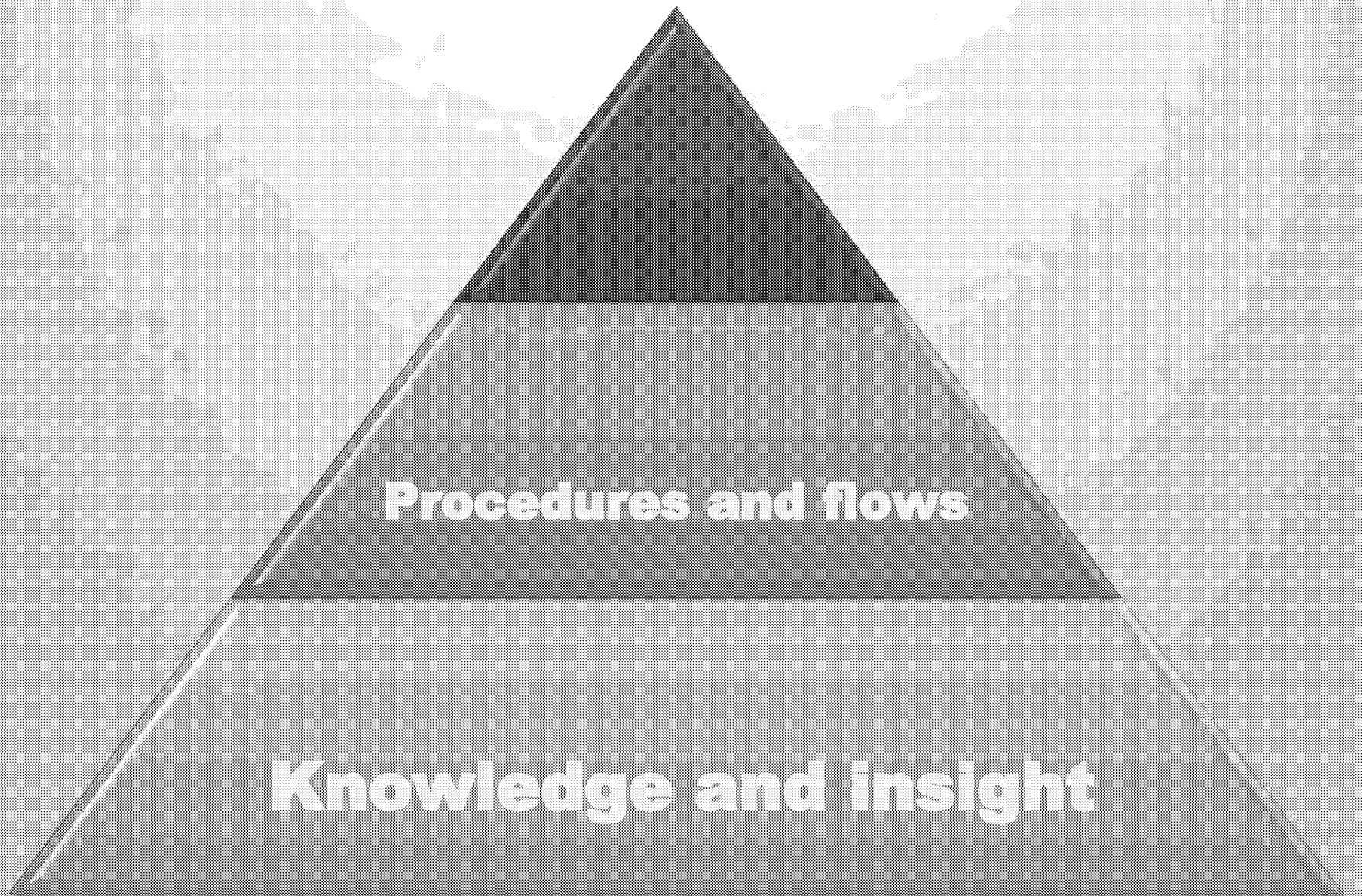
Healthy Firefighters and the Skellefteamodell is a DOT-system.

- 2007 ----- > ----- > Healthy Firefighters is described and exemplified by Skellefteamodell (The Swedish Way)

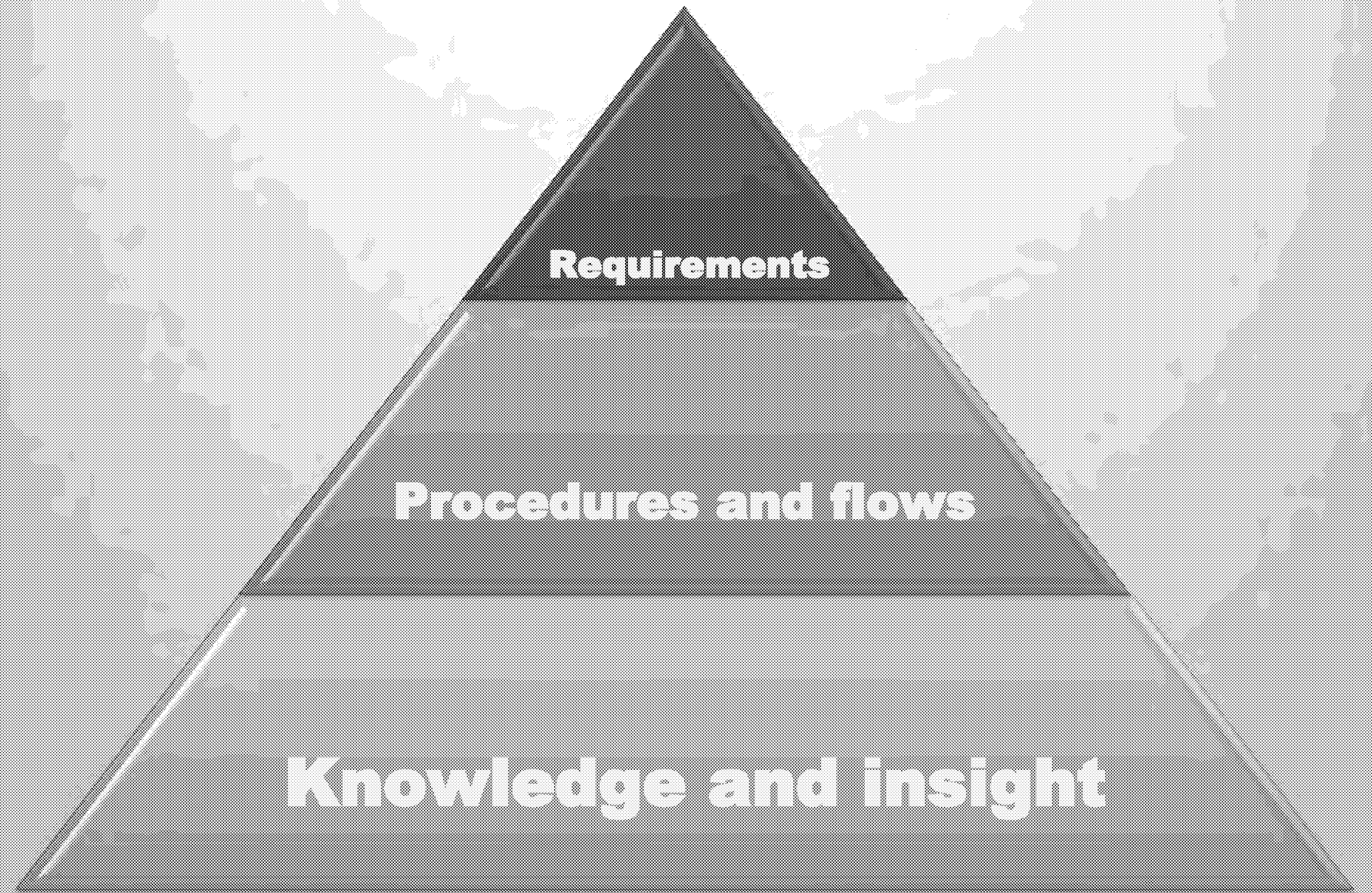
Healthy Firefighters and the Skellefteamodell is a DOT-system.



Healthy Firefighters and the Skellefteamodell is a DOT-system.



Healthy Firefighters and the Skellefteamodell is a DOT-system.



- 2011 Healthy Firefighters (The Swedish Way) was awarded the ”Good practice award” by the European agency for safety and health.

- 2012 EPSU and ETUI adopted The Swedish Way as a basic approach.
  (17 European countries)

- EPSU European federation of public service unions
- ETUI European Trade Union Institute

- 2014 Stefan Magnusson and David Hultman writes the book Healthy Firefighters on behalf of Swedish civil contingencies agency (MSB).

Myndigheten för samhällsskydd och beredskap

HEALTHY

Find the book as a pdf
www.msb.se
Search word: Skelleftea

MSB Myndigheten för samhällsskydd och beredskap


ALLROUND


Healthyfirefighters.com
friskabrandman@gmail.com

Strategies for ensuring duty of care: the managed service

Robert Howard

Managing Director, Rocliff Workwear


ROCLIFF
INDUSTRIAL LAUNDRY
Providing specialist garment cleaning,
repair & traceability to organisations
using technical PPE fabrics

ROCLIFF
INDUSTRIAL LAUNDRY

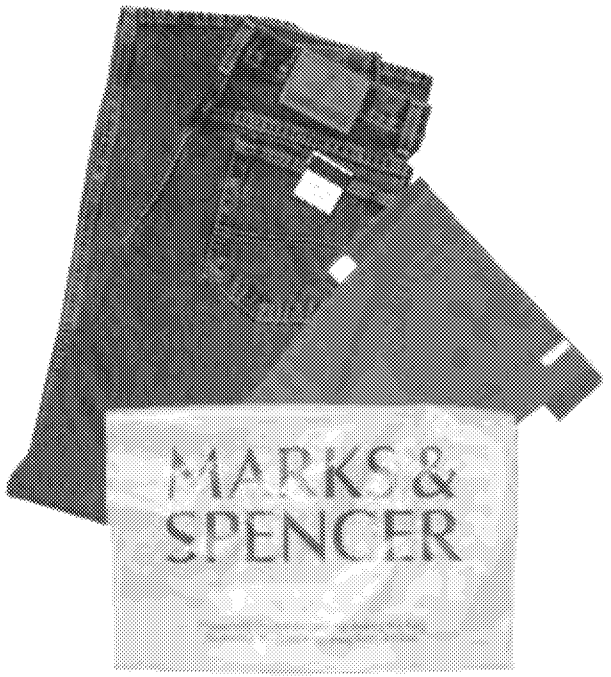
How we evolved into a specialist care laundry

- 30 years+ experience in the Laundry & Dry Cleaning industry
- Initially involved transforming a domestic laundry…

- …into an industrial one processing 65,000 pieces per week

ROCLIFF
INDUSTRIAL LAUNDRY

- Fashion created a niche market
- We became a top stonewash laundry for Marks & Spencer



- Stonewashing up to 15,000 items per week
- Up to 12 chemicals used in a 3 hour process

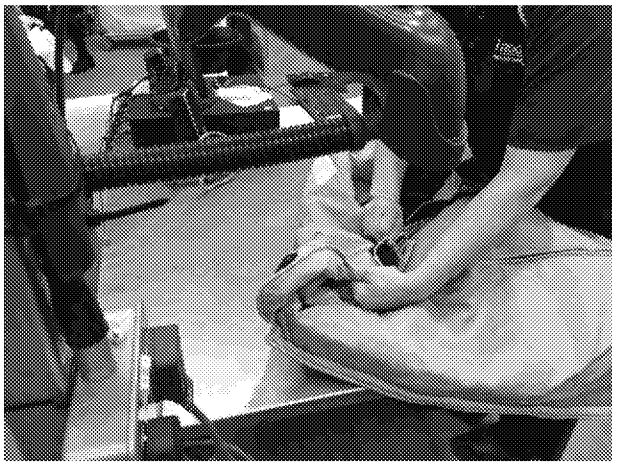
ROCLIFF
INDUSTRIAL LAUNDRY

- Workwear rental division evolved
- Not simply wash control but accurate reporting
- 120,000 barcoded garments in circulation
- Company entered the Fire & Rescue market
- 7 services being served by 2006
- ROCLIFF formed 4 years ago to specialise in cleaning of technical performance work clothing
- Awarded NEPA 1851:2014 accreditation in September 2015

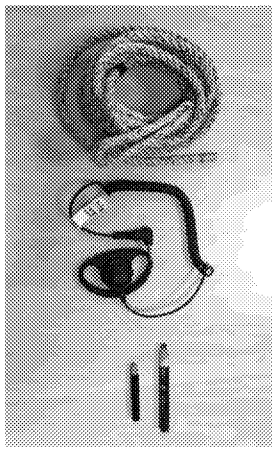
ROCLIFF
INDUSTRIAL LAUNDRY

Pre inspection

- Garments are scanned in



- Thoroughly inspected
- Items left in pockets can be dangerous

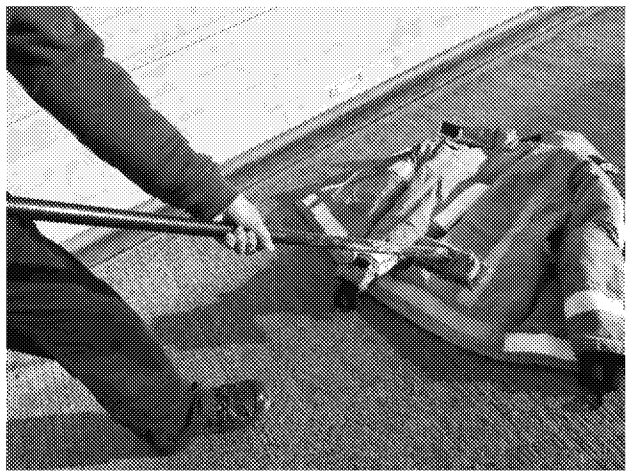


- Zipped and velcroed to avoid pulling and stress

ROCLIFF
INDUSTRIAL LAUNDRY

Wash & Dry

- The old way…



- The current way…

ROCLIFF
INDUSTRIAL LAUNDRY

Manufacturer provides wash and dry parameters

- Wash temperature no more than 60^0 C
- Dry outlet temperature no more than 150^0 C
- pH level 6-10

- No optical brightening agent
- No natural soaps

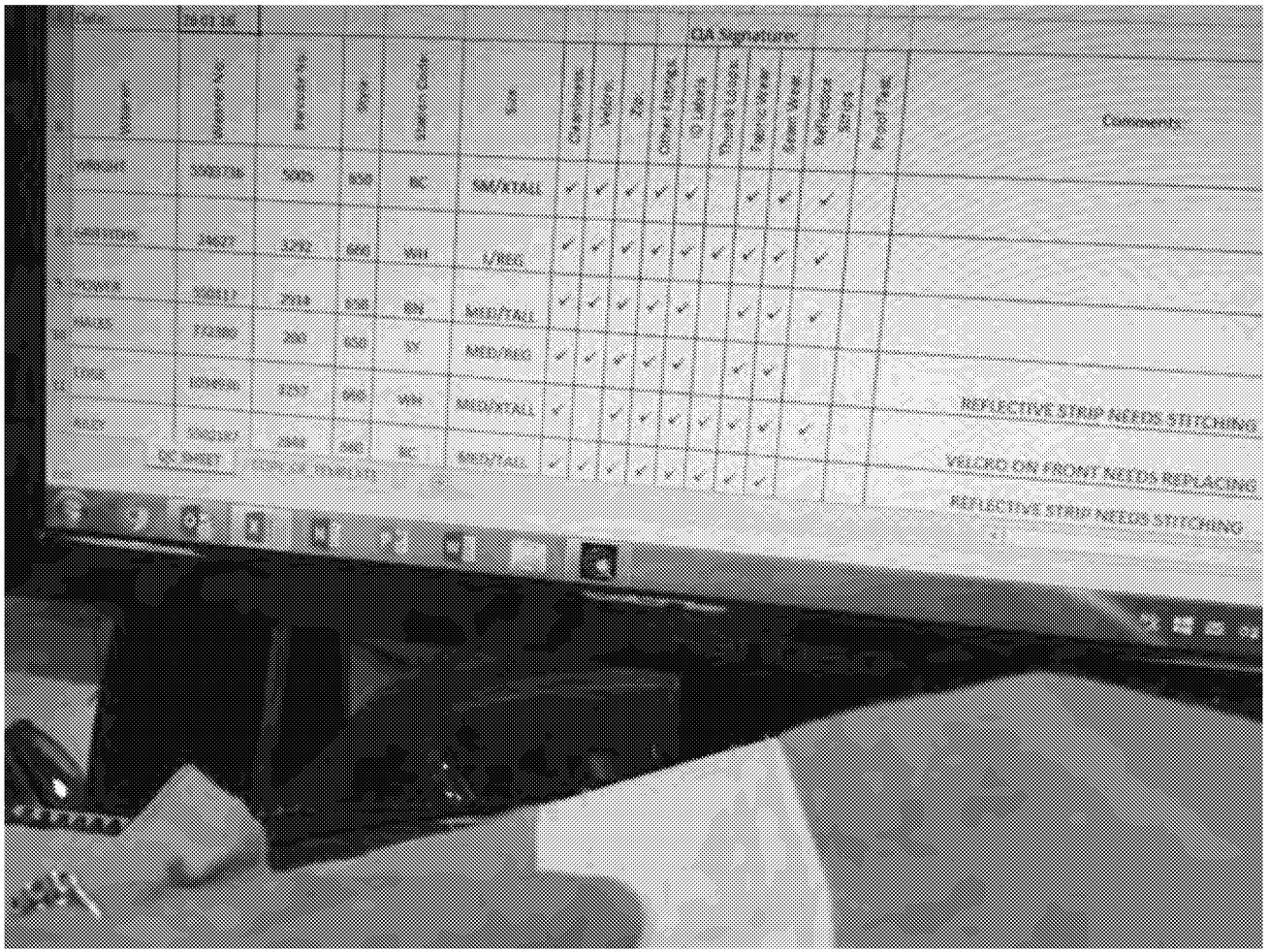
ROCLIFF
INDUSTRIAL LAUNDRY

- Both washing machines and dryers are loaded to 50% capacity
- Water to fabric ratio is critical
- Wash: 9.5 litres of water to 1 Kg of fabric
- Rinse: 12 litres of water to 1 Kg of fabric
- Other controls: 2 people for program selection
- Washing machines and dryers calibrated by temperature strips

ROCLIFF
INDUSTRIAL LAUNDRY

Post inspection

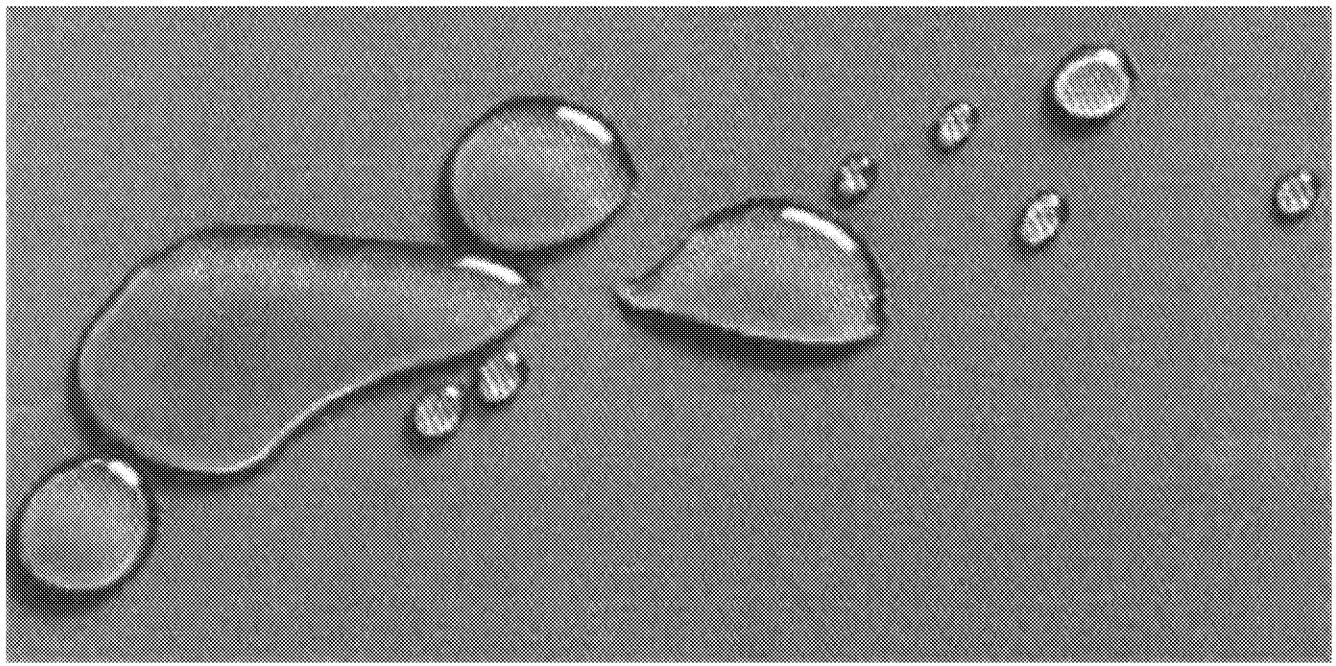
- Cleanliness
- 10 point inspection



ROCLIFF
INDUSTRIAL LAUNDRY

Post inspection

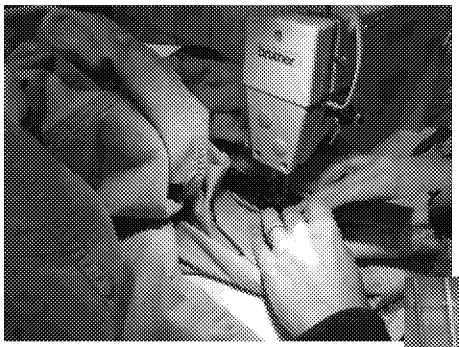
- Test water proofing

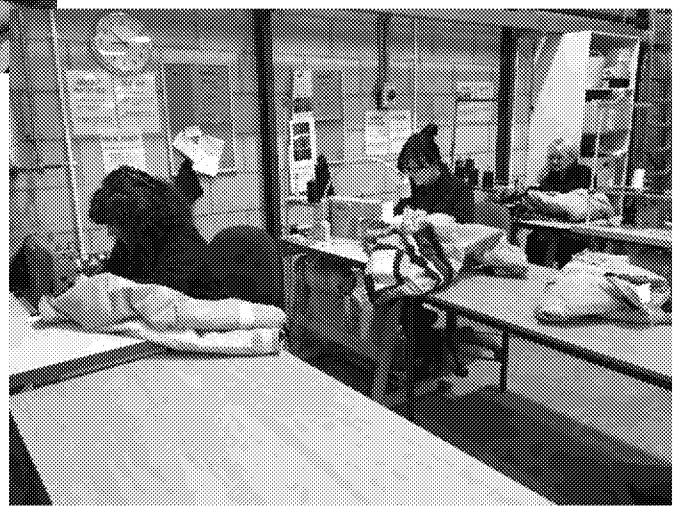


ROCLIFF
INDUSTRIAL LAUNDRY

Repairs

- Machinery





- Components sourced from manufacturers
- Staff are accredited by the garment manufacturer
- Scanned out on completion after repair data inputted

ROCLIFF
INDUSTRIAL LAUNDRY

Traceability

- Barcode

ROCLIFF
INDUSTRIAL LAUNDRY

Traceability

- Wearer Wash Exception Report

WEARER WASH/EXCEPTION REPORT

CONTRACT NO.	WEARER NO.	NAME	ISSUE NO.	SIZE	PRODUCT	LAST IN	LAST OUT	NO. OF WASHES	BARCODE ID	ISSUE DATE
XYZFRS	1	SMITH JOHN	1	MED R	TUNIC GOLD PBI	12 1 16	14 1 16	17	150403	23 11 14
XYZFRS	1	SMITH JOHN	2	MED R	TUNIC GOLD PBI	23 12 15	27 12 15	15	150404	23 11 14
XYZFRS	1	SMITH JOHN	1	MED T	TROUSERS GOLF PBI	12 1 16	14 1 16	14	150405	23 11 14
XYZFRS	1	SMITH JOHN	2	MED T	TROUSERS GOLF PBI	23 12 15	27 12 15	12	150406	23 11 14
XYZFRS	2	DAVIES FRED	1	LARGE R	TUNIC GOLD PBI	4 12 15	6 12 15	8	150861	23 11 14
XYZFRS	2	DAVIES FRED	2	LARGE R	TUNIC GOLD PBI	8 11 15	10 11 15	12	150862	23 11 14
XYZFRS	2	DAVIES FRED	1	LARGE XT	TROUSERS GOLF PBI	4 12 15	6 12 15	8	150863	23 11 14
XYZFRS	2	DAVIES FRED	2	LARGE XT	TROUSERS GOLF PBI	8 11 15	10 11 15	12	150864	23 11 14
XYZFRS	3	JONES SAM	1	SMALL R	TUNIC GOLD PBI	17 11 15	19 11 15	2	150877	23 11 14
XYZFRS	3	JONES SAM	2	SMALL R	TUNIC GOLD PBI	8 3 15	10 3 15	5	150878	23 11 14
XYZFRS	3	JONES SAM	1	SMALL R	TROUSERS GOLF PBI	17 11 15	19 11 15	2	150879	23 11 14
XYZFRS	3	JONES SAM	2	SMALL R	TROUSERS GOLF PBI	8 3 15	10 3 15	5	150880	23 11 14
XYZFRS	4	EVANS BRIAN	1	MED R	TUNIC GOLD PBI	0 0 00	0 0 00	0	150976	6 6 15
XYZFRS	4	EVANS BRIAN	2	MED R	TUNIC GOLD PBI	12 1 16	14 1 16	1	150977	6 6 15
XYZFRS	4	EVANS BRIAN	1	MED R	TROUSERS GOLF PBI	0 0 00	0 0 00	0	150978	6 6 15
XYZFRS	4	EVANS BRIAN	2	MED R	TROUSERS GOLF PBI	12 1 16	14 1 16	1	150979	6 6 15

ROCLIFF
INDUSTRIAL LAUNDRY

- Repair Report By Wearer and Garment

REPAIR BY WEARER AND GARMENT

CONTRACT NO.	BARCODE NO.	WEARER	DATE OF REPAIR	REPAIR DESCRIPTION	GARMENT
XYZFRS	150321	HUGHES JOE	28 10 15	TAPE REPLACE DOWN SLEEVE 26 CMS	TUNIC
XYZFRS	150322	HUGHES JOE	11 11 15	ZIP REPLACE 58CMS - UNPICK	TUNIC
XYZFRS	150323	HUGHES JOE	1 1 16	KNEE PAD RESTITCH - UNPICK	TRS
XYZFRS	150628	BANKS FRED	1 9 15	VELCRO REPLACE COLLAR 6X5CMS	TUNIC
XYZFRS	150628	BANKS FRED	12 12 15	TAPE REPAIR SQUARE BOTTOM LEFT - UNPICK	TUNIC
XYZFRS	150630	BANKS FRED	12 1 16	TAPE RE STITCH FRONT x 3	TUNIC
XYZFRS	150612	JAMES DAVID	19 9 15	TAPE RE STITCH ARM CUFF - UNPICK	TUNIC
XYZFRS	150614	JAMES DAVID	1 11 15	WAIST BAND REPAIR	TRS
XYZFRS	150736	HARRIS PETER	3 10 15	VELCRO REPLACE LEFT FRONT 65CMS - UNPICK	TUNIC
XYZFRS	150217	HART SIMON	29 9 15	TAPE RE STITCH FRONT	TUNIC
XYZFRS	150217	HART SIMON	12 10 15	CUFF STRAP SEAM REPAIR - UN PICK	TUNIC
XYZFRS	150219	HART SIMON	4 1 16	PATCH LARGE UNPICK	TRS
XYZFRS	150220	HART SIMON	15 1 16	TAPE RE STITCH FRONT x 2	TUNIC

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- Repair Report By Repair Type

REPAIRS REPORT BY REPAIR TYPE

REPAIR CODE	REPAIR TYPE	NO.OF REPAIRS DONE BY TYPE
700	TAPE REPLACE SQUARE BOTTOM LEFT - UNPICK	7
701	TAPE REPAIR SQUARE BOTTOM LEFT - UNPICK	14
702	TAPE RE STITCH FRONT	216
703	TAPE REPLACE DOWN SLEEVE 26 CMS	23
704	TAPE RE STITCH ARM CUFF - UNPICK	112
705	TAPE RE STITCH SLEEVE - UNPICK	67
706	VELCRO REPLACE COLLAR 6X5CMS	17
707	VELCRO RE STITCH RIGHT FRONT	6
708	VELCRO REPLACE LEFT FRONT 65CMS - UNPICK	18
709	ZIP REPLACE 58CMS - UNPICK	7
710	CUFF STRAP SEAM REPAIR - UN PICK	8
711	CUFF AND THUMB LOOP REPAIR	14
712	KNEE PAD RESTITCH - UNPICK	63
713	WAIST BAND REPAIR	14
	TOTAL	586

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- Depreciated Residual Value Report

DEPRECIATED RESIDUAL VALUE OF GARMENT

DEPRECIATION PERIOD	10 YEARS

CONTRACT NO.	WEARER NO.	NAME	ISSUE NO.	SIZE	PRODUCT	NO. OF WASHES	BARCODE ID	DEPREC/WEEK	RESIDUAL VALUE	ISSUE DATE
XYZFRS	1	SMITH JOHN	1	MED R	TUNIC GOLD PBI	17	150403	£ 0.47	£215.26	23 11 14
XYZFRS	1	SMITH JOHN	2	MED R	TUNIC GOLD PBI	15	150404	£ 0.47	£215.26	23 11 14
XYZFRS	1	SMITH JOHN	1	MED T	TROUSERS GOLF PBI	14	150405	£ 0.34	£155.72	23 11 14
XYZFRS	1	SMITH JOHN	2	MED T	TROUSERS GOLF PBI	12	150406	£ 0.34	£155.72	23 11 14
XYZFRS	2	DAVIES FRED	1	LARGE R	TUNIC GOLD PBI	8	150861	£ 0.47	£215.26	23 11 14
XYZFRS	2	DAVIES FRED	2	LARGE R	TUNIC GOLD PBI	12	150862	£ 0.47	£215.26	23 11 14
XYZFRS	2	DAVIES FRED	1	LARGE XT	TROUSERS GOLF PBI	8	150863	£ 0.34	£155.72	23 11 14
XYZFRS	2	DAVIES FRED	2	LARGE XT	TROUSERS GOLF PBI	12	150864	£ 0.34	£155.72	23 11 14
XYZFRS	3	JONES SAM	1	SMALL R	TUNIC GOLD PBI	2	150877	£ 0.47	£215.26	23 11 14
XYZFRS	3	JONES SAM	2	SMALL R	TUNIC GOLD PBI	5	150878	£ 0.47	£215.26	23 11 14
XYZFRS	3	JONES SAM	1	SMALL R	TROUSERS GOLF PBI	2	150879	£ 0.34	£155.72	23 11 14
XYZFRS	3	JONES SAM	2	SMALL R	TROUSERS GOLF PBI	5	150880	£ 0.34	£155.72	23 11 14
XYZFRS	4	EVANS BRIAN	1	MED R	TUNIC GOLD PBI	42	150976	£ 0.47	£ 12.22	28 8 05
XYZFRS	4	EVANS BRIAN	2	MED R	TUNIC GOLD PBI	56	150977	£ 0.47	£ 12.22	28 8 05
XYZFRS	4	EVANS BRIAN	1	MED R	TROUSERS GOLF PBI	39	150978	£ 0.34	£ 8.84	28 8 05
XYZFRS	4	EVANS BRIAN	2	MED R	TROUSERS GOLF PBI	62	150979	£ 0.34	£ 8.84	28 8 05

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Future Possibilities

Machinery

Liquid Carbon Dioxide Dry Cleaning

- At 700psi and 12^0 centigrade becomes liquid
- CO_2 pumped into wash drum with the garments
- Detergents are added to the liquid CO_2
- After cleaning process CO_2 is pumped back to storage tank and distillation takes place to remove soiled particles
- Drum is neutralised and garments are dry

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Advantages

- Less fabric damage
- Non toxic
- Very good for smoke removal and motor oils
- No risk of shrinkage
- No steam water or effluent costs

Very few dry cleaners or laundries using CO_2 currently but several Fire restoration companies using it in the USA

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Washing Machines

- Machines that calculate detergent and water levels based on weight of load added – limits wastage and inefficiency

- Information direct from machine to PC showing cost per load and number of loads per machine together with the stage cycle of all machines

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Dryers

- Infrared sensors that constantly measure temperature of garments in dryer
- Guarantees constant drying even in under and over loaded batches
- No over dried garments

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Other future considerations

- Direct computer link from Laundry to customer to directly access reports

- A UK Care and maintenance accreditation standard

- Continued research into methods to maximise effectiveness of cleaning and minimise fabric and textile coating damage

Thank you for your time

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"Defining the difference"

T 01743 442121 sales@rocliff.co.uk

The PPE Evolution

Ian Callaghan

PBI Performance Products

Ian Callaghan

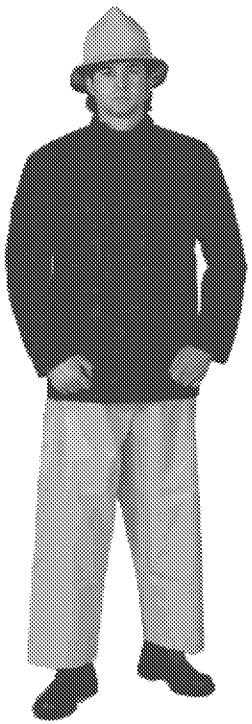
- **International Sales & Marketing Director**

PBI Performance Products, Inc.

- **FIRESA – Vice Chair**
- **CSL (CFOA, Service, Limited) Director**

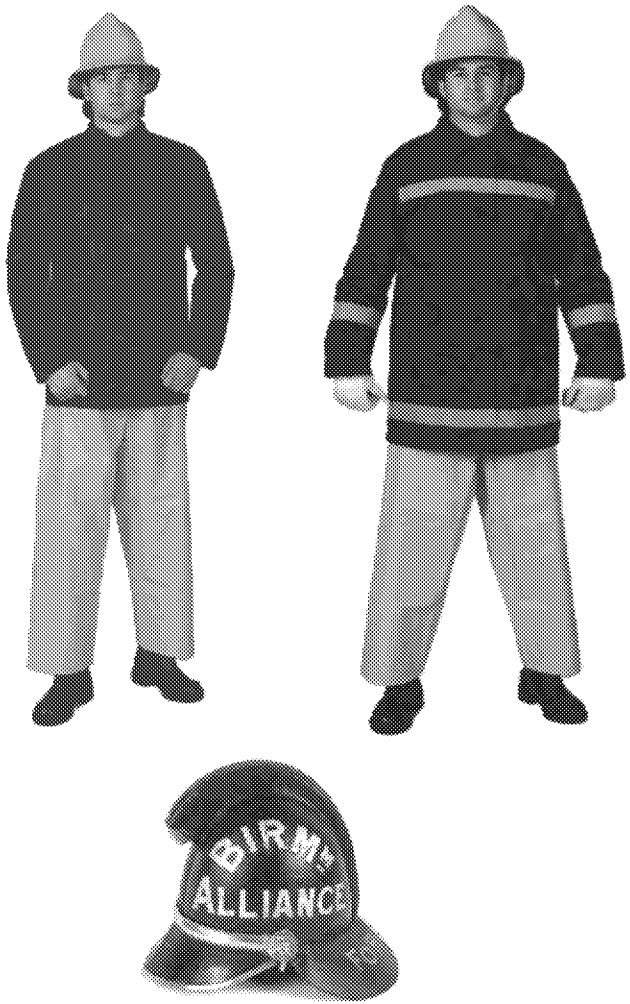
The PPE Evolution

- Where we were:
- Where we are:
- How far we have come:
- Where we hope to be:



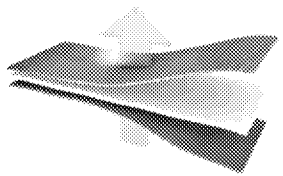
History – the start.

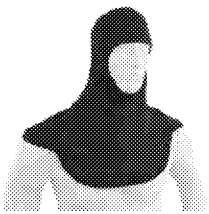
- Where we were.
- Traditional cork helmets, yellow wet leggings, woollen tunics, etc.
- Firefighter duties.
- Was there Care & Maintenance?

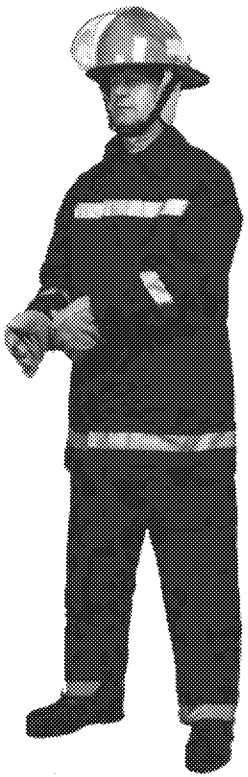


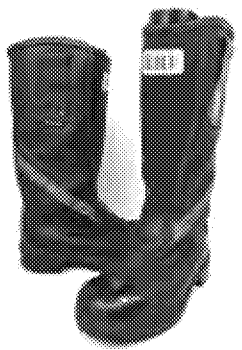
Improvements/ moving forward

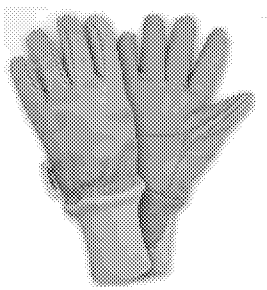
- New technical fabrics
- Introduction of waterproof/ breathable liners
- New designs
- New helmets/ fire hoods
- Protection levels
- Care & Maintenance?





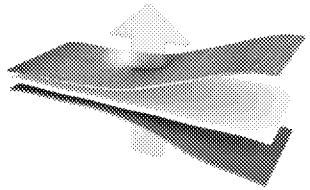


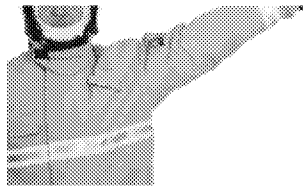


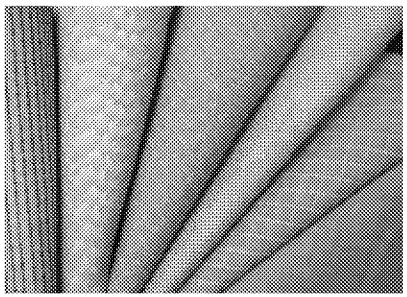


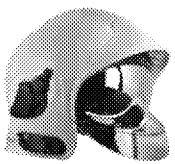
Where we are now

- High technical fibre/ fabrics
- New membranes
- Liners
- Lightweight
- Ultimate design
- Protection levels
- Helmets, boots, gloves
- Care & Maintenance programs
- A change in the Firefighters' role



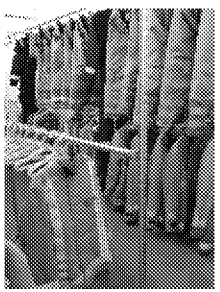






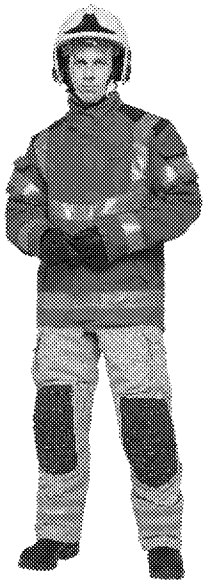
Care and Maintenance

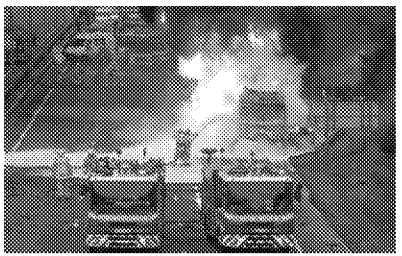
- Firefighters carrying out their own washing (home/ station)
- Log book system
- Repairs
- Managed systems
- Pick ups
- 27 point Inspections after washes – “fit for purpose”
- Additional PPE items, 2 hour call outs, pool stock
- In the US they have a standard for care and maintenance 1851 (NFPA)
- Question: Why don’t we have one in Europe?
- Do Firefighters understand the importance?
- Do they know when an item is damaged, dirty or needs replacing?



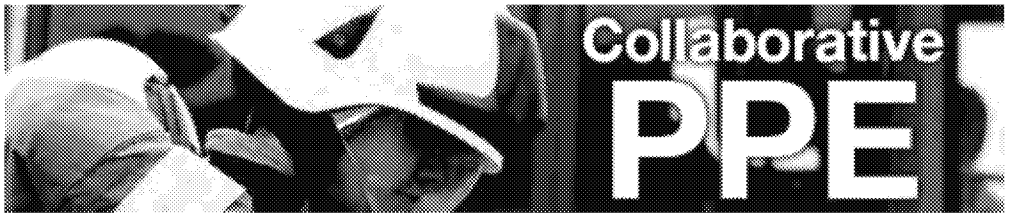
Next chapter

- Firefighters' role
- Designs to support the modern fire services, (i.e. Manchester/ Gothenburg)
- Importance of care, maintenance and safety for firefighters



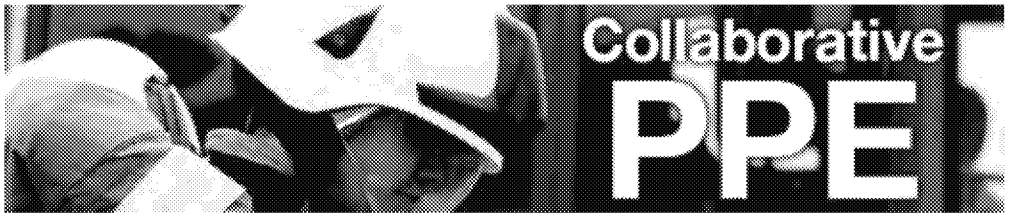


Continued- Care and maintenance requirements



- PPE to meet the day to day demands of a modern firefighter 2017-2023+, recognising the varied activities undertaken and environments in which they work.
- Multi-functional; suitable for different activities and conditions
- Protection; as appropriate when required!
- Lightweight: Or do we mean breathable and ergonomic?
- Durable, tough, long-lasting; value for money
- Ease of use; putting on, taking off, adjusting
- Comfortable; breathable, ergonomic
- Compatible; with other elements of PPE ensemble (interfaces)
- Ease of decontamination; Asbestos, chemicals etc…

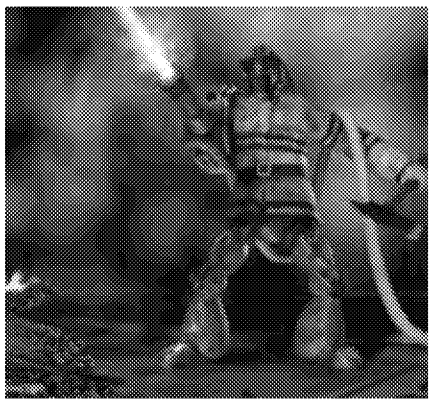
Continued- Care and maintenance requirements

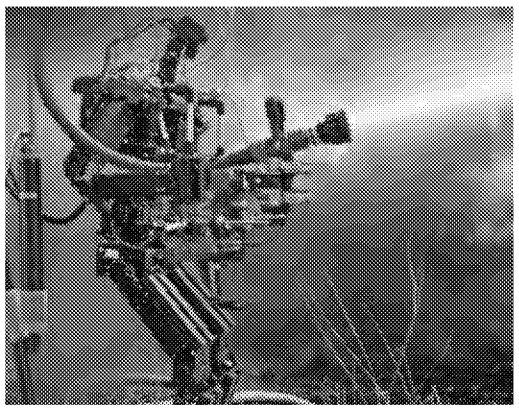


- Non-personal issue, with station pool stock
- Personal issue, with pool stock controlled by supplier
- Common requirements:
- Laundry and repair
- Measuring
- Service calls
- 2 hour requirement for pool stock
- Station audits

The PPE Evolution

- "As a Fire Market we have all improved and grown together."
- Look what we have achieved.
- Where will we end up in the future?





THANK YOU

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